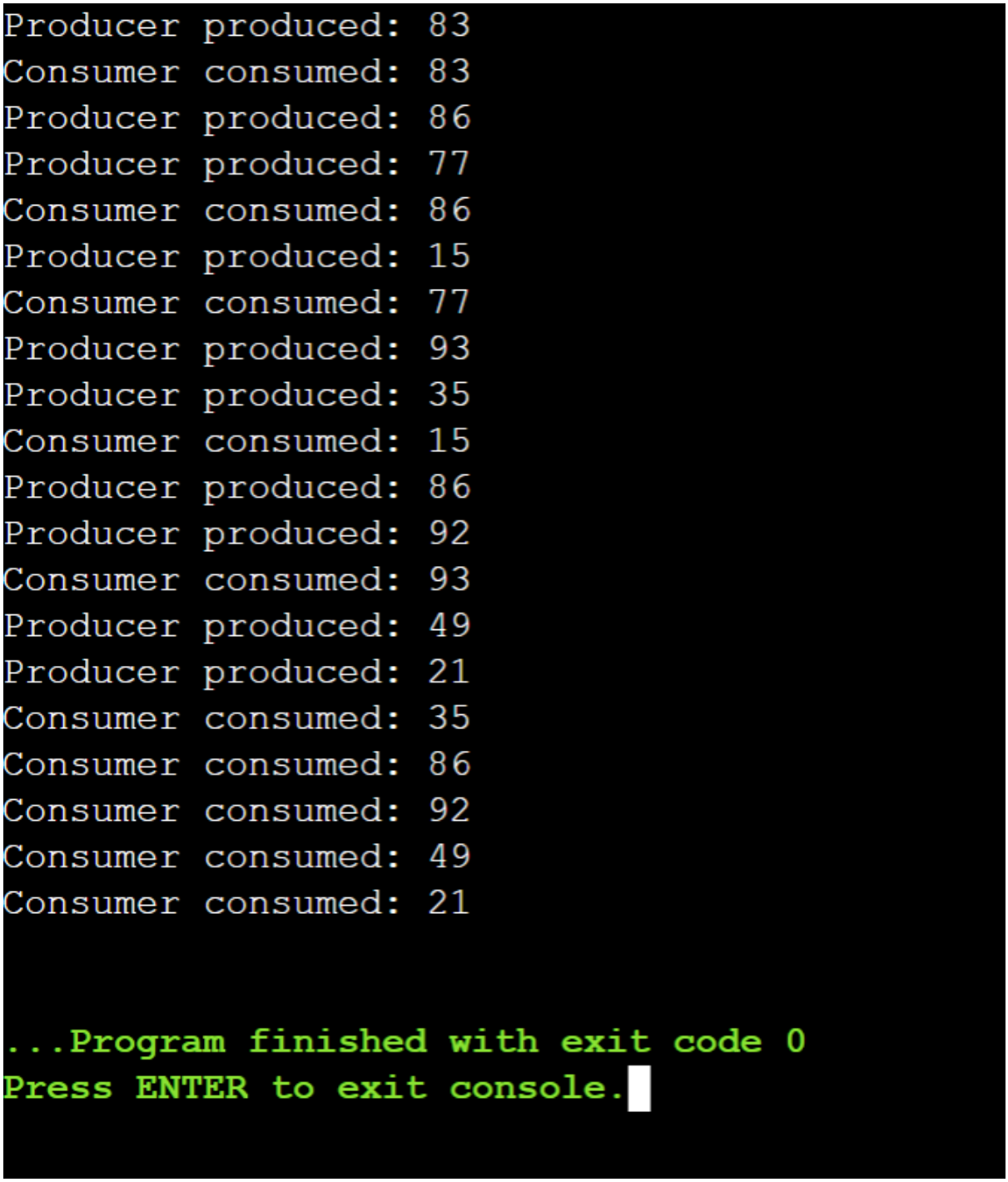
```
#include <stdio.h>
#include <stdlib.h>
#include <pthread.h>
#include <semaphore.h>
#include <unistd.h>

#define SIZE 5

int buffer[SIZE];
int in = 0, out = 0;

sem_t empty, full, mutex;

void* producer(void* arg) {
    int item;
    for (int i = 0; i < 10; i++) {
        item = rand() % 100;
        sem_wait(&empty);
        sem_wait(&mutex);

        buffer[in] = item;
        printf("Producer produced: %d\n", item);
        in = (in + 1) % SIZE;

        sem_post(&mutex);
        sem_post(&full);

        sleep(1);  // Simulate time
```

```
    }
    return NULL;
}

void* consumer(void* arg) {
    int item;
    for (int i = 0; i < 10; i++) {
        sem_wait(&full);
        sem_wait(&mutex);

        item = buffer[out];
        printf("Consumer consumed: %d\n", item);
        out = (out + 1) % SIZE;

        sem_post(&mutex);
        sem_post(&empty);

        sleep(2);  // Simulate time
    }
    return NULL;
}

int main() {
    pthread_t prodThread, consThread;

    sem_init(&empty, 0, SIZE);  // Initially SIZE empty slots
    sem_init(&full, 0, 0);      // No full slots
    sem_init(&mutex, 0, 1);     // Binary semaphore for mutual exclusion
```

```
    // Create threads
    pthread_create(&prodThread, NULL, producer, NULL);
    pthread_create(&consThread, NULL, consumer, NULL);

    // Wait for threads to complete
    pthread_join(prodThread, NULL);
    pthread_join(consThread, NULL);

    // Destroy semaphores
    sem_destroy(&empty);
    sem_destroy(&full);
    sem_destroy(&mutex);

    return 0;
}
```


Producer produced: 83
Consumer consumed: 83
Producer produced: 86
Producer produced: 77
Consumer consumed: 86
Producer produced: 15
Consumer consumed: 77
Producer produced: 93
Producer produced: 35
Consumer consumed: 15
Producer produced: 86
Producer produced: 92
Consumer consumed: 93
Producer produced: 49
Producer produced: 21
Consumer consumed: 35
Consumer consumed: 86
Consumer consumed: 92
Consumer consumed: 49
Consumer consumed: 21
...Program finished with exit code 0
Press ENTER to exit console.